APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/740,078	12/18/2003	Marc Boulle	33155.15	1359

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EXAMINER
DAYE, CHELCIE L

ART UNIT	PAPER NUMBER
2161	

DATE MAILED: 09/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/740,078	BOULLE, MARC
	Examiner	Art Unit	
	Chelcie Daye	2161	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *18 December 2003*.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *15-28* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *15-18, 21, 22, and 27-28* is/are rejected.

7) ☒ Claim(s) *19, 20, 23-26* is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *18 December 2003* is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☒ All   b) ☐ Some * c) ☐ None of:

      1. ☒ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1.   This action is issued in response to Application filed December 18, 2003.

2.   Claims 15-28 are pending.

Drawings

3.   The drawings are objected to under 37 CFR 1.83(a) because they fail to show

the method of discretization of attributes as described in the specification. Any

structural detail that is essential for a proper understanding of the disclosed invention

should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in

compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid

abandonment of the application. Any amended replacement drawing sheet should

include all of the figures appearing on the immediate prior version of the sheet, even if

only one figure is being amended. The figure or figure number of an amended drawing

should not be labeled as "amended." If a drawing figure is to be canceled, the

appropriate figure must be removed from the replacement sheet, and where necessary,

the remaining figures must be renumbered and appropriate changes made to the brief

description of the several views of the drawings for consistency. Additional replacement

sheets may be necessary to show the renumbering of the remaining figures. Each

drawing sheet submitted after the filing date of an application must be labeled in the top

margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If

the changes are not accepted by the examiner, the applicant will be notified and

informed of any required corrective action in the next Office action. The objection to the

drawings will not be held in abeyance.

Claim Objections

4.   Claim 17 is objected to because of the following informalities: a period (.) is

located at the end of limitation (a). Appropriate correction is required.

Claim Rejections - 35 USC § 112

5.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter, which the applicant regards as his invention.

6.   Claims 15,17,21,27, and 28 are rejected under 35 U.S.C. 112, second

paragraph, as being indefinite for failing to particularly point out and distinctly claim the

subject matter which applicant regards as the invention.

Claims 15,27,and 28 recite the limitation "the value" in limitation (d) and (b),

respectively. Examiner is uncertain as to what 'value' applicant is referring to, since

there was no prior mention of a value within the previous limitations. There is insufficient

antecedent basis for this limitation in the claim.

Claims 17 and 21 recite the limitation "said set of the value" in limitation (b).

Examiner is uncertain as to what 'set' of what 'value' applicant is referring to, since there

was no prior mention of a set of value within the previous limitation. There is insufficient

antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8.   **Claims 15-18,21,22,and 27-28 are rejected under 35 U.S.C. 103(a) as being**

unpatentable over "ChiMerge: Discretization of Numeric Attributes", by: Randy

Kerber, published: 1992; referred to hereinafter as 'Kerber', in view of "Relative

Unsupervised Discretization for Regression Problems", by: Marcus Ludl,

published: 2000; referred to hereinafter as 'Ludl', and further in view of Chi2:

Feature Selection and Discretization of Numeric Attributes", by: Juan Liu,

published: 1995; referred to hereinafter as 'Liu'.

Regarding Claims 15,17,21,and 27-28, the combination of Kerber in view

of Ludl, and further in view of Liu, disclose a method of discretization of a source

attribute of a database containing a population of individuals with the object in

particular of predicting modalities of a given target attribute, said method

comprising the following steps of:

(a) partitioning of said modalities of the source attribute into adjacent two-

by-two elementary intervals (pg.123, 2nd ¶ and pg.124, column 2, lines 1-7,

Kerber),

(b) evaluating for each pair of adjacent elementary intervals of said set of the value of .chi..sup.2 of a contingence table after a possible merge of said pair (pg.124, column 2, 1st full ¶, Kerber),

(d) skipping directly to step f) as long as the value .DELTA..chi..sup.2 of the variation of the value of .chi..sup.2 before and after merge is, in absolute value, less than a predetermined threshold value Max.DELTA..chi..sup.2 (pg.125, 1st ¶, Kerber)[1], and

(f) otherwise merging and reiterating of steps b) to e) (pg.124, column 2, 2nd full ¶, Kerber).

However, Kerber is silent with respect to (c) searching, among the set of pairs of elementary intervals that can be merged, for the pair of elementary intervals whose merge would maximize the value of .chi..sup.2. On the other hand, Ludl discloses searching, among the set of pairs of elementary intervals that can be merged, for the pair of elementary intervals whose merge would maximize the value of .chi..sup.2 (Fig.2; pgs.248-249, section 3.3 – entirety, Ludl). Kerber and Ludl are analogous art because they are from the same field of endeavor of discretization of attributes. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Ludl's teachings into the Kerber system. A skilled artisan would have been motivated to combine as suggested by Ludl at pgs.246 and 247, last ¶, in order to present a context-sensitive discretization algorithm that can be used in both supervised and

unsupervised settings; wherein the trees within the discretization strategy are

significantly smaller, while only losing minimal accuracy. As a result, providing a

considerable advantage for comprehensibility issues, which ultimately optimizes

the system. However, Kerber in view of Ludl are silent with respect to (e)

stopping of the method if there are no elementary intervals that make it possible

to reduce a probability of independence. On the other hand, Liu discloses

stopping of the method if there are no elementary intervals that make it possible

to reduce a probability of independence (pg.389, column 1, lines 8-11, Liu).

Kerber, Ludl, and Liu are analogous art because they are from the same field of

endeavor of attribute discretization. It would have been obvious to one of

ordinary skill in the art at the time of the invention to incorporate Liu's teachings

into the Kerber in view of Ludl system. A skilled artisan would have been

motivated to combine as suggested by Liu at pg. 391, in order to create a simple

algorithm to determine the intervals of attributes and also select features

according to characteristics of data. Therefore, the algorithm continues until an

inconsistency is detected, forcing the system to stop.

Regarding Claims 16,18,and 22, the combination of Kerber in view of Ludl,

and further in view of Liu, disclose a discretization method wherein said

predetermined threshold value Max.DELTA..chi..sup.2 is such that for a target

attribute independent of the source attribute the value .DELTA..chi..sup.2 of the

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[1] Examiner Notes: The predetermined zone of atypical values corresponds with the threshold values.

variation of the value of .chi..sup.2 before and after merge is always less than

said value Max.DELTA..chi..sup.2 (pg.124, column 2, 1st full ¶, Kerber) with a

predetermined probability p (pg.125, 1st ¶, Kerber).

Allowable Subject Matter

9.   Claims 19,20,and 23-26 are objected to as being dependent upon a rejected

base claim, but would be allowable if rewritten in independent form including all of the

limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject

matter: the predetermined threshold value Max.DELTA..chi..sup.2 is equal to the

function of .chi..sup.2 of degree of freedom equal to the number J of modalities of

the target attribute minus one for a second probability p to the power 1/N where

N is the size of the sample of the part of the database to which said discretization

method is applied: Max.DELTA..chi..sup.2=Inv.chi..sup.2.sub.J-1(p.sup.1/N),

where Inv.chi..sup.2 is the function that gives the value of .chi..sup.2 as a

function of a given probability p; a step of verification that the effectiveness of the

source attribute for modalities in a given interval for each target attribute is

greater than the predetermined value, and if such is not the case, to implement

the merge of said interval with an adjacent interval; establishing the

predetermined threshold value Max.DELTA..chi..sup.2 consists in using a

previously calculated table of values of mean and standard deviation as a

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Also, the "significance level" corresponds to the valuation variable characterizing the behavior of the

function of the number of modalities of the source attribute and of the number of

modalities of the target attributes to determine by linear interpolation from said

table of values the mean and standard deviation of Max.DELTA..chi..sup.2

corresponding to the attributes to be grouped, and then to determine, by using

the inverse normal law, the corresponding predetermined threshold value

Max.DELTA..chi..sup.2 which will not be with the probability p; for two target

modalities, the mean of Max.DELTA..chi..sup.2 is asymptotically proportional to

2I/.pi., where I is the number of the source modalities; and for two source

modalities, the law of Max.DELTA..chi..sup.2 is the law of .chi..sup.2 with J-1

degrees of freedom, J being the number of target modalities;

Other Prior Art Made of Record

1.   Evans et al. (US Patent No. 6,336,106) discloses a system and method for

partitioning a real-value windowed attribute into ranges, wherein the values within each

range generally correspond to a particular class of results associated with runs of a

process.

merge.

Points of Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chelcie Daye whose telephone number is 571-272-3891. The examiner can normally be reached on M-F, 7:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Gaffin can be reached on 571-272-4146. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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